The Gray Wolf and Its Reintroduction to the Yellowstone National Park

An Honors Thesis (HONRS 499)

by

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On the ragged edge of the World
I'll roam
And the home of the Wolf
Will be my home.

- Robert Service

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SECTION I

INTRODUCTION

This thesis has been prepared as a study of the reintroduction of the grey wolf into the Yellowstone National Park. We cannot look at just this issue alone because many other aspects must be studied. This paper will therefore include the historical basis, folklore, Indian legends, biology and behavior, wolf management, and lastly, wolves around the world.

Everyone knows the Big Bad Wolf, but only a few of us know Canis lupus. The symbolic wolf retains its power to intimidate and obsess, even if its real counterpart remains somewhat obscure and impotent. Indeed, sometimes one is left wondering if Americans are more content with the image and the shadow than the tangible creature. Certainly the problems seem simpler, the costs and inconveniences of management and coexistence with the wolf are infinitely less, when we deal merely with the mythic. Nurtured on a nearly continuous diet of vicarious experience through the media of books, films, and television, our literate society often seems satisfied with the mere appearance of reality.

The crucial question, however, is whether or not we have talked enough about the biological, social, economic, and psychological complexities of the wolf-human relationship to proceed wisely with reintroduction and management of wolves. Are we willing to confront the deeply-ingrained antipathy toward wolves which we find among rural, and especially among resource-dependent populations? And are we prepared to defend the notion that

the ecological and ethical values of a wolf population are somehow translatable into tangible benefits at least equivalent if not superior to those offered by our present extraction of resources from a wolfless environment? Our discussions of the symbolic wolf will be justified only when we have convinced ourselves that we must move beyond the image and deal with the real animal.

SECTION II

CHAPTER 1 HISTORICAL OVERVIEW

Through our subconscious: red-eyed, devious, conspiratorial wolves that kill to satiate their lust. Soulless demons pursuing horse-drawn sleighs through the dark winter forest. These wolves of our Anglo-American cultural mind may have little in common with the wolves that live and die, largely unseen, in the northern forests and tundra. But centuries of legends, myths, stories, art and belief in a wolf that is the physical embodiment of evil are not easily dispelled.

How we perceive the wolf usually says more about our own human culture than about Canis lupus itself. For several thousand years of Old World descent have been an agrarian people for whom the wolf was an economic, physical, and spiritual threat.

It is probable that our earliest ancestors - those stone age hunters of Europe - regarded wolves with respect. "We know that the North American hunters - the Indian tribes of woodlands and plains - held the wolf in high esteem, imitating its hunting techniques, seeking its power" (Oakley: 2).

And we know that far beyond human memory the early people tamed wolves. They may have captured wolf pups as pets, or perhaps for food. Wolves scavenging human camps may have become increasingly accustomed to the presence of people and become part of the camp. However it was accomplished, the two predators - man and wolf - formed an alliance and the course was set for the breeding of the first domestic animal. Man's best friend.

Ironically, several thousand years later mankind would breed dogs specifically for the hunting and killing of wolves.

As the pack hunting instinct of wolves remains in domestic dogs, human respect and even admiration for the wolf has run a thin and intermittent thread through European and American culture.

Respect for the wolf is evidenced in the story of Romulus and Remus, the Mowgli stories, and occasional fables that promote the wolf as the quintessence of freedom. Like American Indians, early Anglo-Saxon kings and nobles named themselves after wolves, thus associating themselves with the cunning and fierce fighting abilities of the animals. Lewis and Clark in their journals referred to the wolf as the "shepherd of the buffalo." But this image of the wolf has usually withered against the black image of the animal.

Barry Lopez relates in his book, Of Wolves and Men, a trip he took to the Pierpont Morgan Library in New York. Here he chose books from the Middle Ages to do research on wolves. He chose the Middle Ages Manuscripts because there are wolves in all of them, and because the Middle Ages, during which these very manuscripts were being either written or eagerly read, was a time when the wolf was distinctly present in folklore, in church matters, and in the literature of the educated classes.

In bestiaries such as those Lopez chose you will "frequently find a wood cut of the wolf with his foot in his mouth - an allusion to the belief that if the wolf broke a twig and thereby

alerted the shepherd's dogs to his presence, he would turn around and snap at his own foot to punish it" (Lopez: 205).

In the history of Saint Edmund, says Lopez, a ninth-century king of England, appears the story of his murder and decapitation by invading Danes, and the statement that his head was guarded against further desecration by a great gray wolf, until it was retrieved by his friend a year later and properly buried (205).

In the first canto of Dante's Inferno in the Commedia the wolf appears in one of the oldest and most durable associations in its history, as a symbol of greed and fraud. In the eighth circle of Hell, Dante finds those condemned for "the sins of the wolf": seducers and hypocrites, magicians, thieves, and liars.

And in Pliny's Historia Naturalis there is an account of werewolfry, one of the earliest, which Pliny himself passes on with skepticism. About a family called Anthus in Arcadia, Greece, one of whose members is chosen by lot every nine years - to go away into a deserted place and be transformed into a wolf.

Lopez goes further to explain that all these ideas came to the fore at a particular time in history, in the Middle Ages - a time of growing enlightenment and of crushing ignorance and superstition (206). The medieval mind, more than any other mind in history, was obsessed with images of wolves. A belief in werewolves was widespread and strong. Pagan festivals in which wild men, mythic relatives of wolves, played the central roles were popular. Peasants were in revolt against their feudal lords, and the hated nobles were represented by wolves in the

proletarian literature. Medieval peasants called famine "the wolf." Avaricious landlords were "wolves." Anything that threatened a peasant's precarious existence was "the wolf."

Fear of real wolves occasionally bordered on hysteria. "Wolves did kill travelers and they did occasionally transmit a terrible disease, always fatal, for which there was no cure: rabies" (Lopez: 208). The wolf threatened a peasant's spiritual world by exhuming bodies, and hungry wolves standing in stark tableaus on piles of the dead during the Black Plague were a chilling reminder of what little separated peasants from a life of scavenging. "A family's goats, sheep, cows, pigs, and poultry represented both sustenance and income to them - and it could all be wiped out in a single night by a pack of wolves" (Lopez: 208).

The Roman Church, which dominated medieval life in Europe, exploited the sinister image of wolves in order to create a sense of real devils prowling in a real world, according to Lopez (208). During the years of the Inquisition, the church sought to smother social and political unrest and to maintain secular control by flushing out "werewolves" in the community and putting them to death. In so doing it deepened fears about the wolf, in whatever form.

Lopez writes further that in the dim woods that lay beyond the plowed fields of medieval villages there grew a sun spurge called wolf's milk (Euphorbia Lelioscopia), and wolf's fist (Lycoperdon bovista), and wolf's claw (Lycopodium sp.) and wolf's thistle (Carlina acaulis), and the small yellow flowers of the

poisonous wolf's bane (Aconitum ly coctonum). On the perilous roads of these same dark woods travelers feared being waylaid by either highwaymen or wolves, and the two often fused in the medieval mind: the wolf and the outlaw were one, creatures who lived beyond the laws of human propriety (208). To call for "the wolf's head" was to pronounce death on a man accused of wrongdoing. He could then be killed by anyone without fear of legal recrimination. A belief in the transmigration of souls held that the soul of a highway robber would be enclosed after death in the body of a wolf. Edgar, the tenth-century English king, accepted in lieu of incarceration a set number of wolves' tongues from a convicted criminal according to the crime, as though one were turning state's evidence.

The medieval mind was one caught between the ignorance of the Dark Ages and the illumination of the Renaissance. In terms of the most potent architectural metaphor of the age, it was moving from a dimly lit Roman cathedral into a soaring Gothic church filled with windows and light.

It is perhaps not an accident that the wolf, a creature of the twilight hours, came and went so frequently in the expressions of a people emerging from the Dark Ages. From classical times he had been a symbol of things in transit. He was a twilight hunter, seen at dawn and dusk. From the common perception that his way of life bore some resemblance to that of primitive man came the idea that wolves themselves had taken form halfway between man and the other animals.

The link between the wolf and a period of halflight - either dawn or dusk, though dawn is more widely known as the hour of the wolf - suggests two apparently contradictory images. The first is the wolf as a creature of dawn, representing an emergence from darkness into enlightenment, intelligence, civilization. The second is a creature of dusk, representing a return to ignorance and bestiality, a passage back into the world of dark forces. Thus, in the Middle Ages, the wolf was companion to saints and the Devil alike. His howl in the morning elevated the spirit. Like the crow of the cock it signaled the dawn, the end of night and the hours of the wolf. His howl at night terrified the soul: the hours of the wolf (famine, witchery, carnage) were coming on.

> "If twilight is the time of the wolf, it is interesting to note that Mars, before he became the Roman god of war, was the agricultural god of the lands that separated cultivated fields from wild woods." The twilight image of the wolf begins to resonate here with the sort of truth the mind both generates and delights in, because Mars' special animal was no other than the wolf" (Lopez: 210).

Our Anglo-American ancestors' attitudes towards the wolf began to change when their culture began to change - from hunter to herder and ploughman. The wolf was no longer a fellow hunter, but a predator that could decimate a flock of sheep - a family's source of food, shelter and clothing - in a single night.

The wolf was enemy: killer of sheep, cattle, chickens. And killer of people too. Indeed, the European and Asian wolf seems to have been more aggressive than its North American counterpart. "Stories of maneating wolves - the Beast of Gevaudan, said to have killed more than 60 children in France in the mid 1700s; the

tales of wolf packs terrorizing peasant villages in Russia - became both legend and myth" (Oakley: 3).

But the notoriety of wolves has far exceeded the real extent of the wolves' depredations against humans. Other animals also have competed and killed humans. Bears, for example, have killed both people and livestock. And while bears and other predators have been hunted and trapped for bounty and sport, none of these other animals have engendered the fear and loathing of wolves. There is no wolf counterpart to Smokey the Bear. The wolves of children's cartoons are not at all like Yogi Bear.

In Western Culture, the wolf has usually been seen as much more than a large wild dog; it has served as a symbol for all that was dark, wild and uncontrollable.

Perhaps this is because the wolf, of all the carnivores, is most like us. But wolves and humans traveled in small groups of extended families - wolf packs and tribal bands. Both wolves and humans are highly individualistic, yet rely on group cooperation to survive. And the wolf is probably second only to man in its capacity to adopt to extremes of climate. Before the extermination campaigns against the wolf, it ranged from the deserts of Israel to the swamps of Florida, and the frozen arctic of Siberia.

But man, unlike the wolf, left the wilderness and became civilized. The woods became foreign - and thus more frightening - as man moved away from the wilderness and began shaping and creating a new, more comfortable environment. The wilderness was

something to be fought against and tamed - something to be made right with an axe and plow. This attitude developed into a religious fervor with the spread of Christianity.

Subdue and conquer the earth, the Bible admonished in Genesis (46). Wilderness was an imperfect, dark and unhallowed place that awaited improvement by man. Part of that improvement included the removal of the wilderness beasts. And no beast was more deserving of Christian wrath than the wolf. For the wolf had become a symbol of the Devil.

CHAPTER II FOLKLORE IN OUR CULTURE

"Our European-American folklore has taught us, in part, to view the wolf as a life-threatening danger. Folklore may not tell us the "scientific" truths of our time, but it tells us better than almost any other form of human expression about our "feeling truths" (Stekert: 19). It might seem to us that we have always known what things are "good" or "bad." Actually, we have been carefully taught by our culture. That is the nature of folklore. "Rather than being what is 'not true,' or far from our lives, folklore is with us every moment of the day, in an unspoken assumption as well as in our most eloquent proverbs and legends" (Stekert: 20). It consists of traditions we have learned from the culture in which we grew up and into which we grow. In our folklore we find expression of our deepest feelings, including the way we see ourselves in relation to our environment.

It appears, writes Stekert, that the closer human culture has been to the life patterns of the wolf, the more respected the animal has been (20). Thus, when humans were hunters, they admired the wolf. They regarded it as exemplary, even human or divine. This attitude persists among people who value harmony with the natural elements on this planet. However, when some hunters became farmers, the wolf could no longer remain a respected co-hunter; rather, the wolf came to be a concrete threat to human life and livestock. As humans encroached on the wolf's

territory, making farmland of forest, the wolf became a symbol of predation on people's property.

Traditional symbols are compelling and ever-present. More than likely, they differ between cultures. The symbolism surrounding the wolf is no exception. Both among cultures, and even within a single culture such as that of "America," the symbol of the wolf is rich and varied. It acts upon us from within, generating fear, admiration, love, and often hostility. Where can we find this powerful symbolism better expressed than in our folk narratives, sayings, and general beliefs? It is no wonder that folk tales and proverbs about the wolf reveal a dizzying array of images. While scientists seek the "natural" wolf, the folklorist stalks the "symbolic wolf."

What does the hunt of the folklorist yield? What is the wolf like that we hear of in tales and proverbs? We find some wolves who for all the world seem to be and act like human beings. We find the nurturing wolf who raises abandoned children. We find the loyal and friendly wolf who rewards good deeds by humans. We find the intelligent wolf who can reason better, it seems, than can humans. We find the "dangerous" wolf, powerful and hungry, who at times eats to the point of gluttony. "And we find the supernatural wolf who, in its most insidious incarnation, becomes the 'evil' wolf, the dread werewolf who has a particular yen for human meals, especially of children." So writes Ellen Stekert (20).

There are numerous international folktales in which the husband or the wife is an enchanted animal who's spell can be broken only by the spouse burning or somehow destroying the skin of the beast. When this is done, the human is at last set free of the enchantment. In these tales the husband or wife is often transformed into a wolf who changes into a human by day and an animal by night.

There are many folk narratives that are most touching. One of these narratives depicts the wolf as kin to man is a Menomini creation myth in which the wolf is literally a twin brother of the hero. It is the hero who names all the plants and animals of the world, and when he is finished with his task, he and his brother the wolf retire to live in a small dwelling on the edge of a large lake. The wolf hunts for his brother and they are content. However, the hero tells his brother the wolf that the evil beings who dwell in the lake wish him death and he warns the wolf never to cross that body of water. But after a long day's hunt, the wolf forgets, attempts to swim across to his home, and is destroyed by the lake spirits. His brother's mourning ripples across the earth, causing the hills to form and the valleys sink. When his brother, the wolf, returns as a "shade" to him, he tells him to go to the land of the dead and rule there. As is the fate of all mankind, in time they will meet again in that place.

Equally poignant as the "human" wolf is the animal who appears in one of the world's most widely spread legends: that of the wolf who nourishes and raises abandoned or lost children.

The story of the wolf who suckled Romulus and Remus, legendary founders of the great city of Rome, is told in many forms in many cultures. Likewise we hear of the Irish king who was rescued as a baby by a wolf and grew to regain his rightful throne. Many cultures have stories of children raised by wolves, the most famous of which is perhaps, Mowgli, of Rudyard Kipling's Jungle Books. These compelling and widespread themes involve a she-wolf, in stark contrast to the majority of wolf narratives in which the wolf is a male.

But the wolf is not always this close to humans in the tales which depict him as the "good" wolf. He might simply be a friend or a grateful acquaintance - one who acts very much like a human being. The Japanese tell a tale of a brave youth who pulled a bone from the throat of a choking wolf. The story reminds us of one found in Aesop's fables. In the Japanese tale, the grateful wolf rewards the young man with a present of a large pheasant. To the dismay of the youth's friends, the wolf picks a night when they are all at a party, leaving the wolf to deliver the gift to the hero while his friends cower at the sight of the animal.

Not only do many tales tell of wolves who are human-like, nurturing, and grateful, other tales reflect the animal as smart, wise, even more clever than humans.

We admire and even feel a kinship with the wolf who raised so many of those abandoned children. We may laugh at "the gray fool" as the Russians sometimes call the wolf. But when we are alone on a dark night, walking through a forest, the howl of a

wolf will still be a chilling sound. It takes much learning to unlearn such deep set lessons.

But wait, have you ever wondered why we don't sing "Who's afraid of the big bad bear?" After all, the alliteration is so much more effective, and bears have done more documented damage to humans than have wolves. But symbols have their power, and that power rests in our minds and feelings so strongly influenced by our culture. There is no need to abandon symbols, even if we could. But it would be heartening if we only could remember that there is an animal out there, one which is flesh and blood, one which must be understood to be as much a part of our precious, fragile world as any other living thing. "From all evidence, the wrong thoughts. Shaped by Little Red Riding Hood and Jack London, ideas about Canis lupus are both incorrect and so threatening to the endangered species that its best hope for survival may be new studies that reveal the role that wolves play in their ecosystem and the sophistication of their society" (Newsweek: 114).

CHAPTER III WOLVES IN INDIAN LEGENDS

"Before the white man set foot in the New World, wolves roamed freely across what would become the U.S. preying on the great herds of deer, elk and bison. The Indians were so in awe of this skilled predator that many tribes incorporated the wolf in such rituals as ceremonial dances, hoping that braves might acquire some of the animal's courage and stamina. But with the settlement of the continent, the hunter became the hunted" (Time: 56).

Out of respect for our continent's First People we will begin in their way, with a prayer. "Watch Blue Horse, an old Dakota warrior who learned to hunt from wolves. He knows their dawn song and sings it each morning, not with head bowed but with hands aloft and head high. He sings without drum, in the language of Wolf. Then he calls to the West wind, which to his people is the direction of the wolf - The West is where we belong, the Wolves and I, and my old friends now dead. May we meet again on the other side" (Ross: 39).

This picture of Blue Horse was recorded by Natalie Curtis in 1906, while a few wolves still remained on the great Plains. It tells us of the respect between equally competent hunters, a respect typical of the people who crossed the Bering Strait to become this continent's Native Americans.

Humans and wolves survived in this land because they were resourceful and because each was independent yet willing to help those less able among them. Native Americans, as they spread

into widely differing climates and conditions, learned how to live from all creatures, from bird and darting mouse to those seemingly without enemy but man - wolf, eagle, badger, bear. The Indian people saw that each animal, no matter how small, had an important place on this earth and had lessons to teach us. Nature was their authority and their great book; they learned from observation.

Ross, in Wolf! writes, "Eagle Chief, a Pawnee of the Bear Society, once explained to Curtis, 'In the beginning of all things, wisdom and knowledge were with the animals, for Tirawa, the One Above, did not speak directly to man. Tirawa spoke to man through his works and the Pawnee understand the heavens, the beasts, and the plants.' When Pawnee buffalo hunters watched wolves they saw hunters like themselves, with skill and endurance, showing ferocity against prey or foe, ably defending their territory against invasion" (40).

The first lesson of the wolf, for the Plains people, was two fold: how to hunt with quiet cunning, and how to share the spoils with the pack. Plenty Coups, chief of the Crow in Montana's Yellowstone River country, once described to historian Frank Linderman the way he and other boys of his tribe were taught to hunt like wolves. "Says Plenty Coups, an older relative gathered village boys each morning, 'Off would go our shirts and leggings. There was no talking, no laughing, but only carefully suppressed excitement while our teacher painted our bodies with the mud that was sure to be there. He made ears of

it and set them on our heads, so that they were like the ears of wolves.' The boys dropped to their knees and 'our teacher would cover our backs with the wolf skins we had stolen out of our fathers' lodges. Ho! Now we were a real party of Crow Wolves and anxious to be off" (Ross: 40).

Another prairie people, the Blackfoot, were aware of the constant presence of wolves. George Bird Grinnel, writes Ross, spent several years observing and recording their lives beginning in the 1890s, before the prairies were plowed. He says that the presence of wolves in those days were interpreted as opportunity rather than danger. Wolves were considered to be great friends, traveling beside the Pawnee, barking and howling as a way of communicating about the game which both man and wolf sought. Men would call out, "No, I will not give you my body to eat, but I will give you the body of someone else, if you will go along with us." Then the People would watch and learn where to find game as they shared food with the wolves (41).

Often the wisdom of the wolf was passed from one generation to another by means of stories. The Shoshone-Bannock people of Idaho used this method. There was a story for everything their people did; whether they sang, danced, prayed, hunted, built a fire, or went to war; every act of their daily lives had its own tradition. From Alaska to the central Plains, from the Pacific Northwest coast to the edge of the Eastern Woodlands, wolf tales such as the one below are plentiful and show us what could be learned from this great and powerful animal.

Coyote and Wolf

Often, Wolf teaches the way to live by example. The Northern Paiute of Idaho suggest the right way to hunt by a contrast between the conscientious Wolf and foolish, impulsive Coyote. Native Americans, like other hunting people around the world, frequently tell stories of a Keeper of the Animals who gives his people what game they need as long as none is wasted; here it is Wolf who keeps all the game of that country in a cave and brings out one at a time, only what can be eaten each day. Coyote, the impatient one, pesters his older brother until Wolf tells him the secret of the cave and Coyote finds it. Now he must lift the skin on the door only a crack, enough for one animal. But at the sight of all those elk, buffalo and deer, Coyote is excited and forgets himself. The cave opening gapes as wide as Coyote's drooling mouth. All the animals pound out of the cave in a crush of hooves and dust. Coyote shoots, but hits nothing. Too late now, he rushes about, shouting to the few remaining deer, trying to herd them back into the cave. One tiny deer quivers behind a shrub; Coyote triumphantly draws his bow and shoots it, just as Wolf approaches.

But Coyote is not discouraged. He proudly served his deer to Wolf, then says, "Well, it looks like the animals have found new homes. How can we hunt them now?"

Wolf, of course, has magical powers. "I put sagebrush into piles," he says. "Soon the piles fill with rabbits." Wolf tells Coyote how to hunt groundhogs, also, thinking these are so slow even Coyote can catch them. But he knows his brother too well, and warns Coyote against becoming careless and letting the Indians catch him as he hunts.

Coyote remembers his instructions for a few minutes. He heaps sagebrush into big piles; soon they are full of rabbits. But Coyote is so hungry that instead of killing the rabbits and taking them home to share as his brother Wolf would do, Coyote eats them all, on the spot. "I can pile the sage and catch more rabbits," he tells himself.

Now like many a foolish younger brother, when Coyote's stomach is full he wants to play, not work. He is seen by the Indians, pursued, and only Wolf can protect him. Again due to Coyote's carelessness in the battle, Wolf is killed. Poor Coyote must spend years gaining the discipline and the resources to take revenge and bring home his brother's remains so that Wolf can return to life (Hoffman: 57).

The contrast between Wolf, who learns from his mistakes, and ever-foolish Coyote is a favorite one among native storytellers - perhaps because Coyote is suspiciously like humankind.

Wolf has other gifts for those who listen. One way the Plains people taught each other the right way to live was through the Medicine Wheel. Medicine means much more than something you ingest to make you well; it is a way of seeing which brings you power while it puts you in the right relationship with the rest of creation.

Each point on the wheel represents a point of view, a way of seeing and experiencing which is signified by a particular animal. Our goal should be first to know our personal style or way of seeing, then to travel around the wheel, see our life from other perspectives. Wolf, with his endurance and caring for his family, is found at one of the points, associated also with the clouds or wind. The young, seeking guidance and knowledge of themselves, take a journey in quest of a vision and a guiding spirit to assist them; those who choose Wolf as their particular Spirit will be lucky; but all can be stronger and wiser by seeing from Wolf's point of view.

Wolf is not always a hero or friend. Agricultural, pastoral people, hovering over their fat, domestic animals fear the gray forms lurking at forest's edge. Among the Navajo and Hopi, one herding sheep and goats, the other farming small plots near their pueblos, the wolf has a dual personality. Remnants of an earlier respect can be found in public and private religious ceremonies

and in a few tales. Small carvings of various animals, called fetishes, are used at altars; wolves are among them. And the Katchinas, those costumed dancers who represent the many sacred powers of the universe, include Wolf. Having Wolf-Katchina dance beside Sheep in the Hopi mountain sheep dance is a recognition of the part which Wolf plays in the harmonious workings of nature.

The Navajo, too, include the power-filled Wolf in one of their most important healing ceremonies. Even today, the best way to heal illness, among the Navajo, is to hire a healer who will arrange a four or five day ceremony. This healer knows the long, complex songs which will unite the sick one with the community and with the distant Sacred Powers which can bring back peace and harmony.

In daily life, however, and in popular folklore, the wolf has a fearful association. Both Navajo and Hopi believe that witches travel in the form of wolves. Those same Powers, which can be beneficial, can be abused and used to harm other people; and so it is commonly believed that witches use the wolf's spirit powers maliciously.

SECTION III

CHAPTER IV DAVID MECH

No thesis on wolves would be complete without reference to David Mech. A biologist with the U.S. Fish and Wildlife Service, he has been a student of the wolf for more than 30 years. "He is regarded by the scientific community as the world's preeminent authority on the species." Today, along with ongoing research in Minnesota, at 52 he works six days a week at his office at the University of Minnesota in St. Paul. He is an adjunct professor in two departments, fisheries and wildlife and behavioral and ecological science.

Mech studies kills made by wolves and wonders precisely how the wolf made its kill and also why a particular animal was the chosen victim. As he runs his fingers down a deer's sinewy legs, he feels for a deformity or an injury, because "he has shown that wolves usually go after the lame, the sick or the aged" (Brownlee: 74). Mech has seen more dismembered deer than he would care to count, but dead animals go with the territory when you study wolves.

Mech has trapped wolves; he has measured them and analyzed their blood; he has seen them kill moose, caribou, arctic hare, deer and musk oxen. He has tracked them on snowshoes. He has raised their pups in his home. Name just about anywhere wolves live, and there's a good chance that he has been there. If someone discovered that wolves lived on the moon, he would probably find a way to get there, too.

Mech spends most of his time in Superior National Forest in Minnesota, the only state in the lower 48 with a sizable established wolf population. All told about 1,200 wolves live in the state (about 300 of them are concentrated in the 4,200 square-mile Superior Forest) (Brownlee: 75). Data is sparse but it is estimated that less then half that number lived in the state two decades ago (Brownlee: 75). It was Mech who was largely responsible for persuading state officials and ranchers that wolves are not the bloodthirsty livestock killers they have historically been made out to be. He was also a behind-the-scenes force in backing Wisconsin's wolf research program and in getting the red wolf reintroduced to North Carolina, and he is active in the movement to return timber wolves to Yellowstone National Park.

Mech studied the wolf since university days but it wasn't until 1986 that he could go to Ellesmere, a barren rock outcropping only 450 miles from the North Pole. He and Jim Brandenburg, a photographer, camped near what they had identified as one of the wolves' trails and gradually the animals began approaching the men.

Mech hit the jackpot late one July night when he found an actual den. The wolves' home was a cave at the bottom of a rock face and as he crept down a hill opposite the opening, a tall wolf came from around the rock and bounded up the hill toward him, hackles raised. Another wolf woke up and gave a hoarse bark. Suddenly the rest of the pack had surrounded him. As it turned out the wolves were more curious than alarmed, and eventu-

ally they accepted him as a sort of honorary pack mate allowing him to camp nearby and sit with them at the opening of the den.

Only once has Mech been frightened by a wolf. That was in 1959, his second summer in Isle Royale National Park. His pilot had set him down half a mile from a pack of wolves that were eating a moose. Mech struggled through deep snow hoping to get a close look, but the wolves sensed him and scattered when he got within 300 yards. Half an hour later he was intently examining the moose carcass when the pilot of his plane buzzed him. Mech looked up to see two wolves charging toward him. Almost by instinct he reached for the revolver he had in his pack. The wolves turned tail and fled. "I instantly regretted having reached for that gun," says Mech. "I've never carried one since" (Brownlee: 76).

Mech and his assistants have prepared and tested a new type of collar. Mech has trapped more than 400 wolves in Superior National Forest and fitted them with radio collars. Over the years they've gotten wise to him (Brownlee: 76).

The new collar carries not only a transmitter but also a tiny receiver, a computer and tranquilizer darts. When a researcher sends the proper radio signal the computer orders one of the darts to be fired into the animals neck and the drug knocks it out. That means Mech won't have to use leg traps to recapture animals anymore.

But before he fits a wolf with the new dart collar he wants to make sure the thing works. Mech and his assistants put on

snowshoes and tramp out into the storm in search of one of the three deer that have already been fitted with prototypes of the collar. They locate a doe about half a mile from the cabin. She's out of sight in a coppice of balsam spruce, but her signal comes in loud and clear. Kyran Kunke, one of Mech's grad students, pushes a button on a radio transmitter to activate the dart. (Brownlee: 77).

They find the doe lying on her side, her brown eyes wide open. Steve Van Asselt, a 23 year-old volunteer on the project throws himself on top of the animal in case the drug hasn't completely knocked her out. At the same time Kunkel injects the doe with another dose of tranquilizer and covers her eyes with a protective cloth hood. Mech stands to one side taking pictures. One assistant draws blood, another snips a bit of hair and skin from the deer's flank for later analysis, and somebody else readies a syringe of yohimbine, an antidote to the tranquilizer. Then the deer's legs are strapped together so she can be weighed. The deer groans as she's hoisted in the air tipping the scale at 175 pounds. Finally, Van Asselt injects her with yohimbine (Brownlee: 77).

On the return trip to the lab Mech is ecstatic. "That was a historic moment," he says. "I've been working 20 years to be able to do that. Now we can look at the wolves more frequently. We can weigh them, test their blood and learn more about their reproductive capacities if we can easily knock them out for a brief period. You just can't do that if you have to spend most

of your time trying to recapture them by trapping" (Brownlee: 77).

After spending three decades of dedicated research, often under hellish conditions Mech has become privy to the smallest details of the lives of wolves. He knows when they go hungry and how many pups they whelp. He has watched a wolf return again and again to the place where its mate died. "Please don't ask me why I study wolves," Mech says. "If you look certain species in the eye there's just a charisma about them" (Brownlee: 77).

Many researchers have written books on their findings of wolf biology, but all under controlled scientific conditions. Mech is the only biologist I have found that has conducted his research under natural conditions. He has lived and studied among them for over 30 years. Because of this and his reputation as an expert biologist I will report from his works on the biology and behavior of the wolf. For I agree with Mech's methodologies and feel they are much more accurate than studying the wolf under captive, controlled conditions.

CHAPTER V BIOLOGY OF THE WOLF

The wolf is a large wild dog. Actually, it is the original dog. More than 12,000 years ago humans domesticated their "best friend" from the wolf. All dogs - from Chinese pugs to St. Bernards - descended from the wolf.

Wolves are the largest member of the dog family which also includes coyotes, foxes, jackals, dingoes, and other "canids." "Adult female wolves weigh 50 to 100 pounds and males 60 to 120; a few individuals may weigh more" (Mech: 9). Most wolves stand tall, with long, slender legs and large blocky feet. Often the animals are at first mistaken for a deer. But close-up one can see that a wolf has a long furry tail, pointed ears, and a long narrowing muzzle. Generally, a wolf's fur is a mottled gray, with black, brown, and whitish shadings on various parts of its body. In high arctic regions, most wolves tend to be white, and in southern Canada a high percentage are black, whereas wolves in the U.S. and Mexico are generally gray.

The main food of the wolf is other animals, usually large ones. "Wolves usually catch and kill their own prey and, although they will eat almost any animal, their main prey are beavers, deer, caribou, mountain sheep, mountain goats, elk, moose, bison, and musk-oxen" (Mech: 9). To spend much time and energy catching mice or other small animals would be a waste in the long run.

Wolves will, however, take advantage of large temporarily available supplies of small prey such as fish or waterfowl, and

they will also eat garbage, berries, and carcasses they find dead. In some areas wolves feed on cows, sheep, dogs, and other domestic animals. "Each wolf requires about 2.5 pounds of food per day. On the average they eat about 5.5 pounds, and if they get a chance, they will eat as much as 13 pounds per day" (Mech: 10).

A single wolf can take even the largest prey if the animal is in poor enough condition. For example, one wolf in Sweden killed 8 adult moose and a calf during one winter. Usually wolves hunt in packs when after large prey.

Wolves hunt by traveling over a large area, using their eyesight and keen sense of smell. "They can detect a cow and twin calf moose a mile and a half away" (Mech: 10). When they find a prey animal, they may get together excitedly and wag tails. Different prey have different kinds of defense. Deer depend on their alertness, speed, and endurance to escape, whereas moose tend to stand their ground and defy the wolves; musk-oxen form a defensive wall or circle, protecting their rumps and facing the wolves with their horns and hooves.

Whatever the defense, the wolves must strive to overcome it. For this they depend on their fine senses, their speed, and aggressiveness. Still, each kind of prey is also expert at applying its defenses. Thus, usually wolves and their prey are fairly evenly matched.

But if the prey has any serious weakness, it will then easily fall victim to the wolves. These weaknesses can vary

considerable. For example, in any crop of young animals, some will be less vigorous than others; they will be more likely to fall prey to wolves. Or, as adult prey animals grow old, eventually they will become weaker and less able to defend themselves. Furthermore, if prey food conditions deteriorate, or extreme weather afflicts the prey, they will become easier for wolves to kill. And finally, if disease, parasites, injuries, or other factors harm the prey, wolves then have the advantage. In all these types of situations, biologists say the prey is "predisposed" to wolf predation.

Thus wolves are constantly faced with trying to find enough predisposed prey. To solve that problem, wolves must travel long and hard. "Their usual rate of travel is about 5 miles per hour. When they do find prey, they can run up to 45 miles per hour" (Mech: 10). Usually, wolves can tell quickly whether they can catch their prey or not, and if not, they give up within a few minutes." However, one Minnesota wolf was observed chasing and following a deer for 13 miles over a 4-hour period" (Mech: 11).

Because of their need to cover long distances to find enough prey, wolves inhabit large territories. Whereas prey animals generally live in only a few square miles and share an area together, wolves are highly territorial. "The territory of a single pack is measured in tens, hundreds, or thousands of square miles, depending on the number of prey. Single wolves have covered as much as 1,600 square miles in one year" (Mech: 11).

Usually one wolf pack tries to keep other packs out of its territory. This reduces the competition for the pack's own prey and helps insure enough food for itself. Thus in the territory of one wolf pack there may be hundreds of prey animals upon which the pack prey. If neighboring packs try to intrude on the territory, the resident wolves chase them, fight them, and sometimes kill them.

Generally, however, wolves do not have to fight with neighbors because they have indirect ways of keeping outsiders away. According to Mech, two such means are well known: howling and scent-marking (11). By howling as a group, wolves tell their neighbors where they are and warn them to stay out. Wolves also use their urine to say the same thing. By sprinkling urine like dogs do on conspicuous objects such as bushes, logs, snow clumps, and rocks wolves leave signposts that may last for weeks. The two systems complement each other: howling tells where wolves are at a given instant; scent-marking tells where wolves have been over a long period. Both mark the territory.

Each territory supports an entire pack of wolves, and a pack is really a family group. Each pack is headed by a set of parents, known as the "alpha pair." These individuals are the mature members of the pack, and the remaining members usually are their offspring. Offspring generally are produced each year, so pack members can be from the last litter or from earlier ones. "Offspring have been known to remain with a pack for as long as 4 years" (Mech: 12).

Among the members of a pack, there is a certain order. According to Mech, no pack member acts independently. Rather, the alpha male and alpha female guide the pack's activities, and the offspring follow their lead. Each animal's position in the social order is known to the other pack members and it remains constant for long periods. The alpha wolf of each sex dominates all the other members of the same sex (12). In large packs, there usually will also be a lowest ranking member of each sex, which is often picked on by its packmates. "When interacting with another pack member a high ranking wolf tends to inflate its size by holding its ears erect, raising its mane, and holding its tail horizontal or straight up. Low ranking wolves do just the opposite: hold ears low, mane down, tail tucked between legs" (Mech: 12), (fig. 1).

By constantly demonstrating their status this way, members maintain the pack order. As breeding season approaches, usually a 6 week period in late winter and spring, social competition increases. Nevertheless, usually the alpha pair holds its position and does the breeding, although, according to Mech's observations, sometimes two pairs may breed in a pack (12). The female comes into estrus for up to 15 days. When bred, she carries the pups for about 63 days. A week or so before the pups' birth, the females seeks a den, which may be a hole in the ground, a crack in a rockpile, a cave, hollow log, old beaver house, or some similar shelter. Often the same den is used each

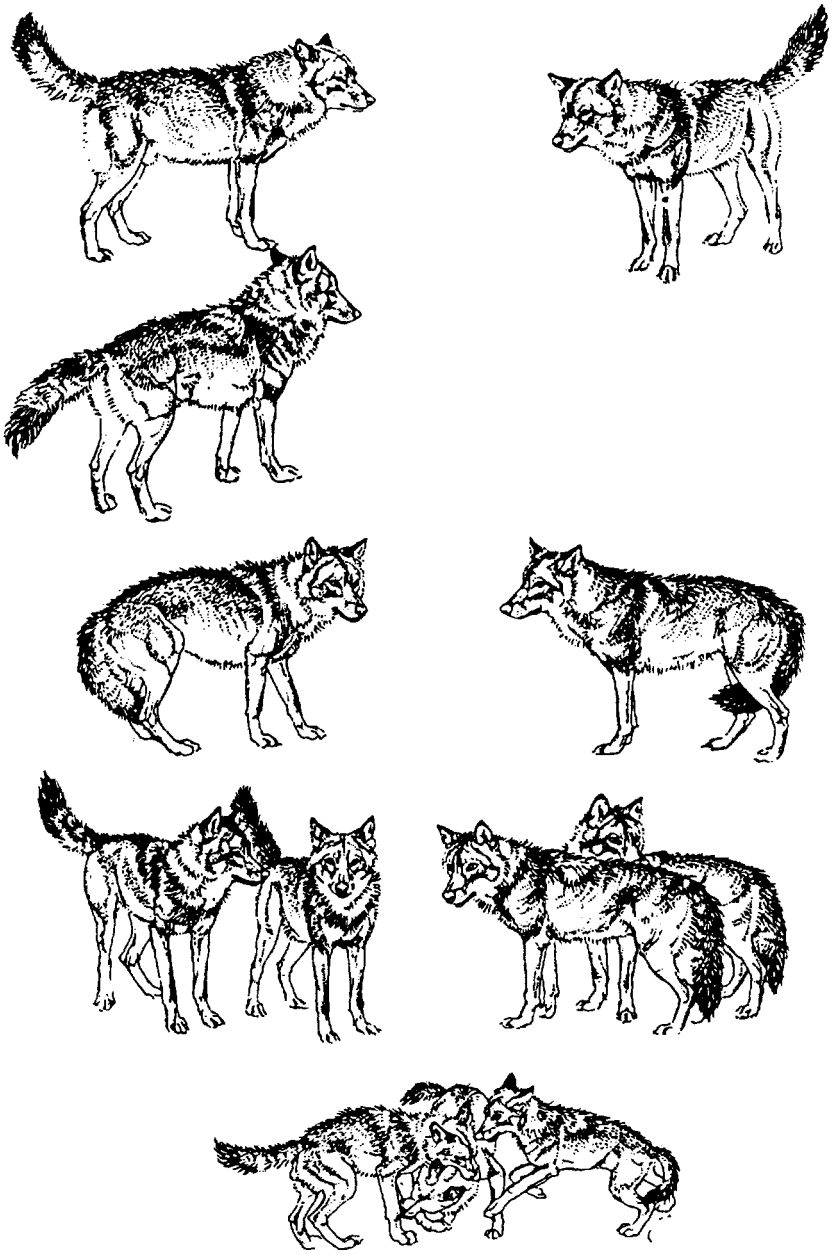

Fig. 1 Social rank in the wolf pack. Top, the two senior animals (1.1 ♂ and 1.1 ♀, with whom the 1.2 ♂ is often associated). Below, some young subdominants (1.3 ♂ and 1.2 ♀). Some juveniles behave like "little alphas." At the bottom of the ranking order come the cubs.

year. Wolves may keep the same mate for many years or may have two or more mates throughout their life.

"A wolf's litter size can range up to 11, but about 6 is the average number of pups produced" (Mech: 12). "The pup's eyes open at day 11 to 15, most puppy teeth are present in about week 3, and weaning takes place at about week 5" (Mech: 12). "After about the eighth week, the pups are moved to a ground nest, where they romp and play over an area of up to an acre, an area known as a "rendezvous site" (Mech: 12). "The pups may spend up to 3 weeks at one site but often are then shifted as far away as 5 miles to another. Probably depending on the degree of development of pups, they may continue this behavior even through winter. However, pups in good physical condition will join adult members of a pack in their travels as early as October" (Mech: 13). "At this time they may weigh 60 pounds and be almost adult size. Adult teeth replace deciduous teeth between weeks 16 and 26" (Mech: 13).

Pups begin to mature at about 10 months of age, but full maturation requires about 5 years. The presence of maturing individuals in the pack causes social tension. Depending on pack size, prey availability, and probably several other factors, some wolves leave the pack and strike out on their own when as young as 10 months of age. "However, most often they remain with the pack until about 16 to 24 months old, and some stay even longer. Occasionally, some offspring take over the breeding in the pack, and their parents leave" (Mech: 13).

Both male and female offspring disperse, and become lone wolves. Males tend to travel farther. Some wolves merely move next door, find a member of the opposite sex, mate, and begin their own pack. However, others drift around the population, covering hundreds of square miles, until they find a vacant territory and mate. Then they settle down and start their pack. Still other dispersers tend to head in straight lines and may travel more than 50 miles before setting up a territory, and taking a mate.

If a wolf pack has no room for additional wolves, dispersers may drift around trying to stay out of the way of the pack. If caught, they will be chased and may be killed. However, if the wolf population still has room for more territories, the dispersers help keep its numbers high. Or they may spread the population beyond its borders into new areas.

Mech reveals that because of several "built-in" control features, wolf populations never really get as high as do most other wildlife populations (13). For example, deer can reach densities of 20 or more per square mile; coyotes and black bears are measured in numbers per 3 or 4 square miles. Wolves rarely reach more than one per 10 square miles over large areas, and more often wolf densities are measured in terms of wolves per 100 square miles. The reasons for this include the wolf pack's nature of holding very large territories, their failure to breed until 3 or more years old, and their tendency to restrict breeding to one or two females per pack.

Thus the wolf lives in relatively low numbers but has the ability of replenishing its populations readily. These characteristics tend to prevent wolves from eliminating their prey, yet they allow wolves to make quick use of whatever prey become vulnerable. Prey animals live in much higher densities, and each herd produces so many offspring that they usually can withstand wolf predation. The best example of these came from research Mech conducted on Isle Royale. He reports that in Isle Royale National Park wolves and moose have lived together without any human interference for 35 years. During a long period of favorable weather, the moose herd built up while wolf numbers remained the same. Then when the weather turned bad for several years, the wolves killed more moose and increased, moose numbers dropped, and eventually the wolves decreased. Now moose are recovering rapidly while wolf numbers have leveled off. In other areas when severe weather or heavy hunting by humans has reduced prey numbers, wolves have helped hold the prey down to low levels. This tendency has caused conflict with humans, so control of wolves has been advocated in such cases.

Another situation in which wolf control is asserted is when wolves kill domestic animals. For example, in Minnesota, Mech found many cattle and sheep farms are situated in wooded areas where wolves live. Ranchers often mistakenly place their dead animals out at the edge of their farms, and wolves feed on them. This practice keeps the wolves around the area, and may even teach wolves that livestock are good to eat.

Whatever the case, wolves do kill cattle and sheep in some cases, and the federal government then tries to destroy the offending wolves. In this way, the level of wolf predation on livestock is kept low. Generally, only about 11 farms out of 10,000 farms in wolf range have any trouble with wolves each year. "Only about 5 cattle per 10,000 and 12 sheep per 10,000 in wolf range are claimed annually to have been killed by wolves" (Mech: 15).

It was just such competition with humans that caused the loss of wolves from most of the U.S., however. Originally wolves inhabited all of North America north of central Mexico. They were capable of surviving in any kind of natural habitat: desert, brushland, prairie, mountain, deciduous forest, boreal forest, swamp, marsh, tundra, and high arctic. As long as there was some kind of large prey in an area, wolves could live there.

Historically, biologists regarded wolves from various areas of North America as representing different races of one species, the gray wolf. Thus they applied names like arctic wolf, timber wolf, plains wolf, Mexican wolf, northern Rocky Mountain wolf, and so on, and these names are still used today. All these types of wolves can interbreed, and it is difficult for anyone except specialists to tell them apart. In the southeastern U.S. the wolf was represented by the "red wolf," which some people think is a different species. However, the red wolf is much the same as the gray wolf, and some biologists consider the red wolf to be merely another race of the gray wolf.

As European settlers tamed much of North America, they killed off many of the wolf's prey and substituted their own large animals: cattle, sheep, horses, pigs, and goats. Wolves then substituted these animals for their natural prey. But humans would not tolerate such competition, so they exterminated wolves from most of the U.S., part of southern Canada, and just about all of Mexico.

Every conceivable method was used to eliminate wolves: guns, traps, poisons, den-digging, bounties, and a wide variety of specialized techniques, many of which were highly inhumane. However, poison was the most effective method. During the anti-wolf campaign, cowboys carried poison, lacing every dead carcass. Government "wolfers" specialized in exterminating wolves. The effort was so effective that wolves were eliminated even from areas where they did not compete with livestock, including Yellowstone National Park.

Today the wolf inhabits only a small part of the contiguous U.S. and is considered an endangered species there except for Minnesota, where it is listed as threatened. According to David Mech, Minnesota still supports about 1,200 wolves over a 30,000 square-mile area bordering Canada (16). Nearby Wisconsin contains 10 to 20 wolves, and Upper Michigan, perhaps 5 to 10; Isle Royale National Park in Lake Superior holds from 15 to 50. Glacier National Park and the adjacent Flathead National Forest in northwestern Montana currently contain approximately 15 wolves, and Idaho probably has less than half that number. "All

current wolf habitat is basically wilderness except part of the Minnesota and Wisconsin wolf range which is semi-wilderness" (Mech: 16).

"Wolves still thrive in Canada and Alaska, which are largely unsettled. There are perhaps some 50,000 wolves throughout about 80% of their original range in Canada, and 5,000 to 7,500 in Alaska" (Mech: 16). In those areas wolf numbers are monitored by state and provincial game departments and generally are managed in much the same way as other wildlife. Wolf numbers are deliberately controlled in some areas of Canada and Alaska to help restore big game herds.

In the long run, it is the preservation of wilderness that will prove to be the single most important factor in insuring that wolves will survive. Without wilderness, wolves constantly get into trouble with humans by preying on domestic livestock and pets. Although wolves are sometimes killed by bears, and they suffer from a few diseases and parasites, their primary enemy by far is the irate human being. If we can preserve enough wilderness, wolves can continue to prey on large wild mammals and minimize competition with humans.

Because of society's recently awakened environmental awareness, the future looks good for the wolves remaining in North America. Certainly there will be no more extensive extermination campaigns, although local wolf control no doubt will continue from time to time. Intensive and long-term wolf studies have been underway in Isle Royale National Park, the Superior National

Forest of Minnesota, and in Riding Mountain National Park, Manitoba. Endangered wolf populations in Wisconsin, Idaho, and Montana are being monitored.

Currently the federal government is even considering proposals for restoring wolves to certain areas. Yellowstone National Park and the Dare County peninsula in North Carolina (for red wolf) are two areas being seriously considered at present. Other possible candidate areas for wolf reintroduction could include central Idaho, the Adirondack Mountains of New York, and the Olympic Peninsula of Washington. Depending on how successful and popular these restorations were, other areas of the West could also be considered. Such restoration could be accomplished successfully as long as the public was willing to accept limited wolf control to minimize imports of wolves on livestock.

Obviously the wolf can never again live in much of its original range. However, the knowledge and the technology now exist to help undo some of the damage an environmentally naive and exploitative society once wrought on wolves. If humans can understand that the wolf, with proper management, can fit back into wilderness ecosystems with minimal damage to human interests, everyone who enjoys the outdoors will be richer.

CHAPTER VI AGGRESSION AND FEAR

The following model of wolf behavior is based on research carried out by Erik Zimen in the Bavarian Forest in Germany. It is based on two impulses: aggressiveness, the tendency to attack, on the one hand, and a fear of injury that can increase to the stage of actual flight on the other.

The wolf's expressive behavior shows the strength of its fear in relation to its aggressiveness. If all aggressive elements as well as fear are absent, there are many different forms of neutral contact-making in which all the elements of expression, such as the corner of the mouth, ears, tail, eyes, body attitude, are normal and movement is loose. With increasing fear as a consequence of a large difference in rank in relation to the other party, or in the event of a direct attack by another, the first reaction is appeasement behavior, beginning with active submission followed by passive submission if apprehension increases still further. All the expressive elements show a complete absence of any tendency to attack. If the other wolf's aggressiveness again increases, this now leads to defense behavior and finally to flight.

If one of two wolves is greatly superior in rank and its aggressiveness, in the absence of fear, increases, it will first of all demonstrate its rank in the usual way. Its attitude and movements will still be loose and its back hairs not raised. Its movement will remain loose even if aggressiveness increases further. Its motivation can be discerned only in its behavior,

not in any concomitant expressive elements. It will attack without inhibition, showing no other sign of its extreme aggressiveness. If the other wolf stands its ground there will be a real fight, but generally it flees. However, pure aggressiveness without fear is rare.

Most aggressive clashes take place in inhibited form - the animal fears its opponent's reaction to an attack. The assailant advances with all the elements of expression directed at the other party. If the latter defends itself against the assailant's snaps, the assailant jumps back and keeps its distance. If the difference in strength or rank between the two is slight, the assailant will not try to bite but will use its body weight, pressing against its opponent chiefly with its hindquarters, while the latter repeatedly snaps at the area of the assailant's throat.

The slightly superior party will turn its head away and thus present the most sensitive part of its body to the inferior party. By averting its head, the superior's only dangerous weapon, the inferior's preparedness to defend itself is diminished, and its snapping movements cease. Should the inferior disturb the temporary equilibrium between the assailant's aggressiveness and its fear by further snapping movements and bites, violent reaction on the assailant's part ensues.

"There is no other situation in which the extremely delicate balance between aggressiveness and fear in the assailant and fear and readiness for defense in the victim is so plainly demonstrat-

ed as in this offering of the throat" (Zimen: 57). Fear prevents the aggressive tendency of the one and the defensive tendency of the other from getting out of hand. Either would immediately lead to an intensification of the clash, with biting and perhaps serious wounding. The inhibition presupposes an accurate reassessment of the opponent, a precise understanding of the latter's communicative signals.

If the difference in rank between the two parties is still further reduced, we observe so-called intimidation behavior. This may be carried out by one party only, the one superior in rank, or two wolves of almost equal rank may try it on each other. The raised back hairs, the strongly inhibited movements, and the averted eyes are all plain signs of fear coupled with aggression. This again generally prevents serious fighting from developing.

A special form of inhibited aggression is the threat behavior of baring the teeth. This is a ritualized inhibited bite and is always a warning. If the other party reacts appropriately by increasing its distance or at any rate by not reducing it, generally no attack will follow. But if it fails to react appropriately the consequence, depending on the relative rank of the parties, will be the forms of aggressive clash previously described. Only the most extreme forms - serious fighting and flight - are not preceded by any threats (fig. 2).

In threat behavior an increasingly aggressive or defensive trend is expressed by the extent to which the bridge of the nose

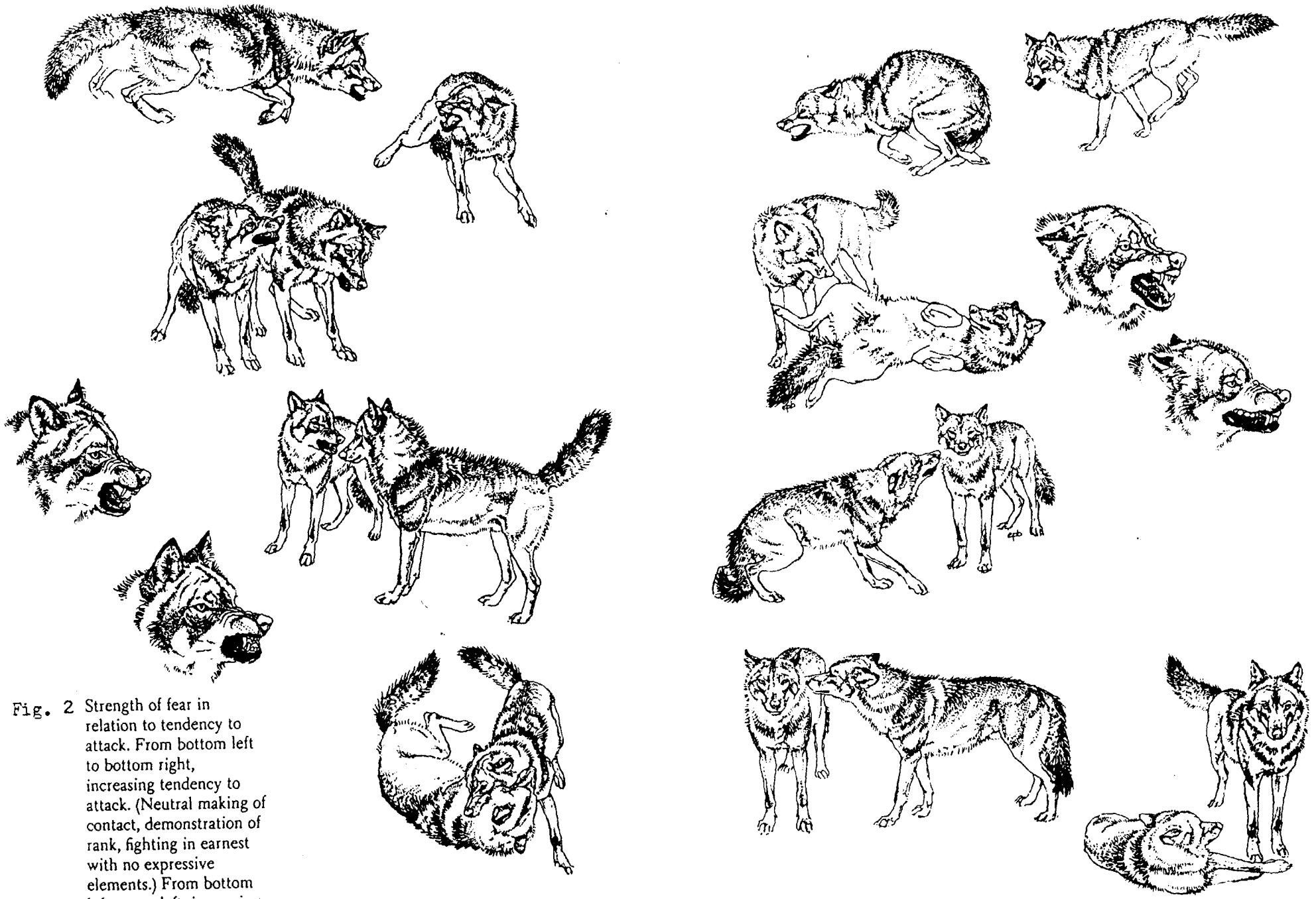

Fig. 2 Strength of fear in relation to tendency to attack. From bottom left to bottom right, increasing tendency to attack. (Neutral making of contact, demonstration of rank, fighting in earnest with no expressive elements.) From bottom left to top left, increasing fear. (Active submission, passive submission, flight). Right, intimidation behavior, presenting the throat, intensive defense

is wrinkled and the teeth bared. The extent to which the mouth is open also indicates how great the readiness to bite is. Shortly before the animal actually bites the mouth is opened wide. If the other party still does not react as expected, biting will indeed take place at this point.

"The fear that inhibits the tendency to attack is expressed by the length of the corner of the mouth and the position of the ears. The longer the corner of the mouth and the farther the ears are drawn down and back, the greater is the fear" (Zimen: 60). Withdrawing the roots of the ears makes the skin of the face smooth, and this, combined with the "flickering" look in the eyes, contributes to the anxious expression of the face, which is very hard to see. If there is less fear and more aggression, the ears are held erect and forward. The structures of the facial skin now appear; in particular, the black spots under the eyes and the eyes' fixed gaze make them look quite different from how they look when threatening is accompanied by fear (fig. 3).

It is interesting to note that when there is an intensive defense threat the corner of the mouth becomes shorter again; this expresses a high degree of readiness to bite. Only the eyes and the position of the ears now betray how frightened the wolf really is.

There are many transitions between the various elements of expression. Sometimes combinations occur that are actually comic. Zimen writes he observed a low-ranking wolf defending a piece of food looking as if it were brave in front and frightened

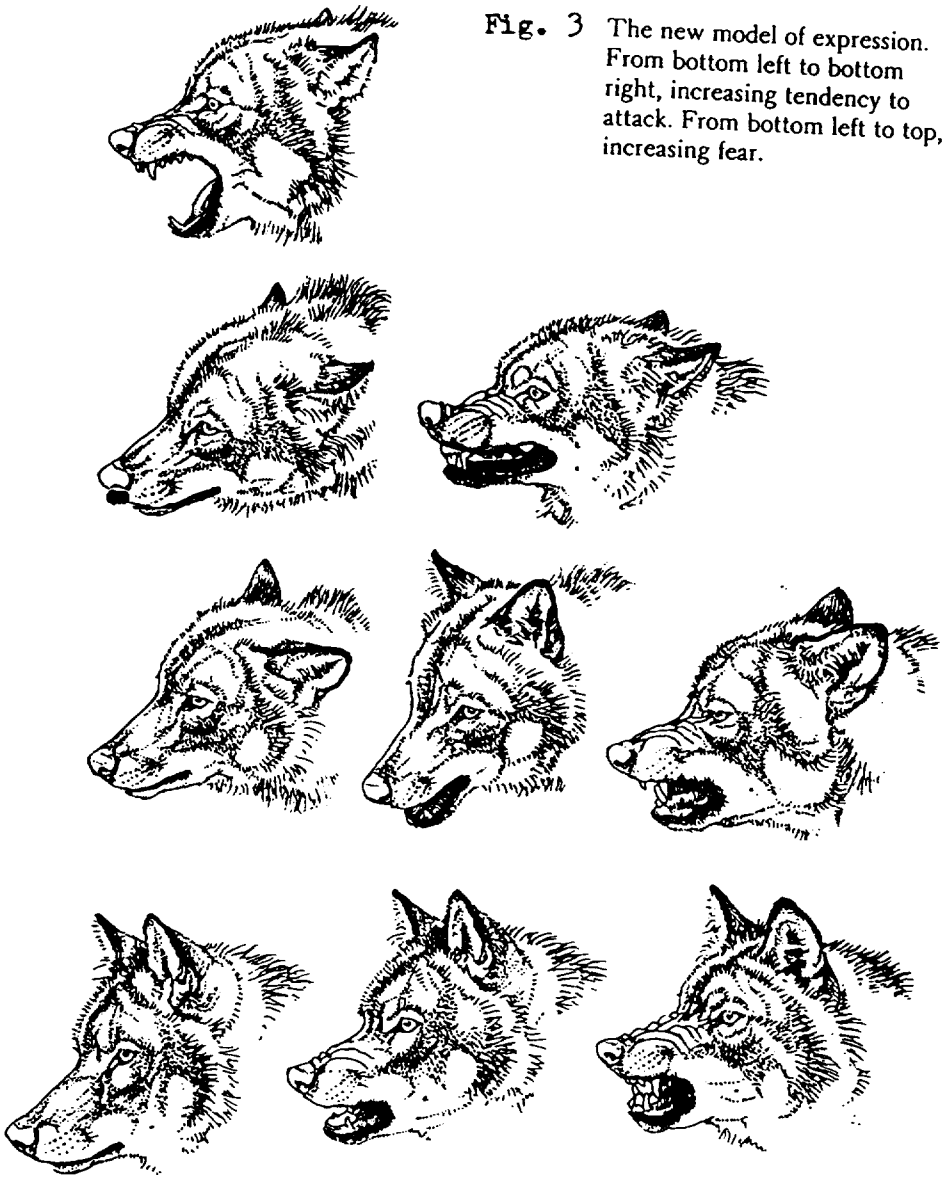

Fig. 3 The new model of expression. From bottom left to bottom right, increasing tendency to attack. From bottom left to top, increasing fear.

behind; "in front it threatened with short lips and ears held forward, but its hind legs were bent and its tail was between its legs." (60).

SECTION IV

CHAPTER VII INTRODUCTION TO THE YELLOWSTONE PROBLEM

Proposals from concerned citizens and organized groups prompted Congress in 1988 to investigate a proposed wolf restoration to Yellowstone National Park. The findings of related studies are detailed in this chapter. The issue of wolf recovery is controversial, as can be seen in Time and Newsweek magazines among others. The roots of the controversy reach back into our nation's history. Our European forebears began to make North America safe for domestic animals soon after the first colony had landed, and we had purposely diminished wolves nationwide by the 1940s.

What do we need to know before we restore wolves to Yellowstone? Is it a biologically viable idea? The next few paragraphs are an attempt to answer some of the questions. The report that follows responds to questions posed by Congress in 1988.

Yellowstone National Park was established in 1872, but slaughter of its big game animals continued through the 1880s; thousands of elk, bighorn sheep, deer, antelope, moose, and bison were killed for their tongues and hides, and their carcasses strychnine - poisoned to kill coyotes, wolves, or wolverines. In 1886 the U.S. Army was assigned to guard Yellowstone and protect its features and wildlife. The Army was pressured to control predators, but in 1897 observers predicted range damage by

gophers if coyotes were exterminated. Meanwhile in Montana alone, 80,730 wolves were killed for bounty from 1883 to 1918.

In 1914 the U.S. Congress passed a law to eliminate predatory animals from all public lands, including national parks. By 1922 some people questioned destruction of wolves in the park, but from 1914 to 1926, 136 wolves were killed in Yellowstone. Pack activity had been eliminated and has not been confirmed since the 1930s. About the same time, 121 mountain lions and 4,352 coyotes were also killed in Yellowstone.

By 1933 National Park Service policy stated, "no native predator shall be destroyed on account of its normal utilization of any other park animal," and "no management measure or other interference with biotic relationships shall be undertaken prior to a properly conducted investigation" (USDI, 1). Yet predator control continued in Yellowstone through the winter of 1934-1935, and war was waged against predators on all the park boundaries with cyanide "coyote getters" and Compound 1080 baits until stopped by Executive Order in the early 1970s.

Adolph Murie wrote the first objective ecological treatise on wolves, The Wolves of Mount McKinley, in 1944. Since that time, dozens of scientists throughout the northern hemisphere have added to our knowledge of wolves. Many of those scientists studied wolves in national parks or similar reserves: Denali, as Mount McKinley was renamed in 1980; Isle Royale; Alberta's Jasper National Park; Manitoba's Riding Mountain; Ontario's Algonquin Provincial Park; and nature reserves of the Soviet Union.

In 1988 the Senate-House Interior Appropriations Conference Committee appropriated $200,000 for the National Park Service and the U.S. Fish and Wildlife Service to address five issues related to restoring wolves to Yellowstone. They wrote:

> The managers agree that the return of the wolf to Yellowstone National Park is desirable. There are a number of concerns about the reintroduction and $200,000 has been included to study questions which have been raised. The managers believe the studies should address, but not be limited to the following:
>
> 1. The issue of whether wolves would or would not be controlled either within or without the Park;
>
> 2. How a reintroduced population of wolves may affect the prey base in Yellowstone National Park and big game hunting in areas surrounding the park;
>
> 3. Would a reintroduced population of wolves harm or benefit grizzly bears in the vicinity of the park;
>
> 4. Clarification and delineation of wolf management zone boundaries for reintroduction; and
>
> 5. An experienced wolf coordinator with the FWS will oversee the full program in full cooperation with the NPS (USDI: 8).

Dr. Steven H. Fritts has been appointed as Rocky Mountain Wolf Coordinator, Montana-Wyoming Field Office, U.S. Fish and Wildlife Service, meeting the requirement of Item 5.

To answer the four questions, the National Park Service and the U.S. Fish and Wildlife Service employed three diverse approaches to gather the information: 1) extensive literature surveys; 2) consultation and compilation of the opinions of 15 experts on North American wolves, bears, and ungulates through a process known as the Delphi techniques, and consultation with experts on Eurasian wolves, bears, and ungulates; and 3) develop-

ment of three computer simulations by predator/prey dynamics modelers at two universities. Wildlife agencies of Idaho, Montana, and Wyoming furnished data for several of the ten resulting studies in this report.

The conclusions and opinions expressed in the studies are those of the authors and Delphi panelists. They were asked to evaluate the potential effects of wolf recovery in Yellowstone in relation to the four questions posed by Congress. They were not asked to evaluate the desirability of wolf recovery in Yellowstone.

The studies should be considered progress reports; the authors will want to read what others have written, and they may want to modify their conclusions based on more complete information. For instance, not all the data on Yellowstone area wolf prey numbers, ungulate ranges and harvests were available to the Delphi panelists (15 wolf/prey experts) when they offered their opinions on questions posed to them.

Questions remain and funding to study them has been appropriated for 1990. Some questions can never be answered definitively unless wolves are experimentally restored and studied in Yellowstone.